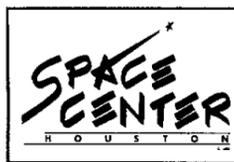




Atlantis returns to the flight rotation after modifications that will allow it to dock with Mir. Story on Page 3.



Space Center Houston's Silver Moon Cafe will close for the summer for renovation. Story on Page 4.

Space News Roundup

Vol. 33

June 10, 1994

No. 23

Gibson to lead first Mir docking flight

STS-71 to launch seven crew members, return eight to Earth

By Kyle Herring

Veteran shuttle commander Robert "Hoot" Gibson, will lead the seven-member STS-71 crew on the first mission to dock with the Russia's Mir space station and exchange space station crews in mid-1995.

Joining Gibson on the mission will be Pilot Charlie Precourt and Mission Specialists Ellen Baker, Greg Harbaugh and Bonnie Dunbar. Russian cosmonauts Anatoly Solovveyev and Nikolai Budarin will

serve as the Mir-19 crew replacing Vladimir Dezhurov, Gennadiy Strekalov and astronaut Norman Thagard who are scheduled to be launched aboard a Soyuz spacecraft next March for a three month stay on the space station as the Mir-18 crew, and return to Earth aboard *Atlantis*.

STS-71 is currently scheduled for launch in mid-1995 aboard *Atlantis*, which was modified to carry a docking system compatible with the Mir. The orbiter will carry a Spacelab

module in the payload bay in which various life sciences experiments and data collection will take place throughout the 10-day mission.

Gibson, 47, currently serves as chief of the Astronaut Office. STS-71 will mark his fifth shuttle flight. His most recent mission was as commander of *Endeavour's* STS-47 flight in September 1992, a cooperative Spacelab mission with Japan. Gibson first flew as pilot of STS 41-B in February 1984 aboard *Challenger*, then as commander of STS-

61C aboard *Columbia* in January. He next commanded *Atlantis' STS-27* Department of Defense mission in December 1988.

Precourt, 38, will be making his second shuttle flight. Since his first mission aboard *Columbia* in April 1993, Precourt has served in Mission Control as an ascent and entry spacecraft communicator. His first shuttle flight, STS-55, was a German-sponsored Spacelab mission.



Hoot Gibson

Please see SOLOVVEV, Page 4

U.S., Canada to enhance cooperation

NASA and the Canadian Space Agency announced last Friday that they have reached an agreement, in principle, that will put U.S./Canadian space cooperation on a long-term, stable footing.

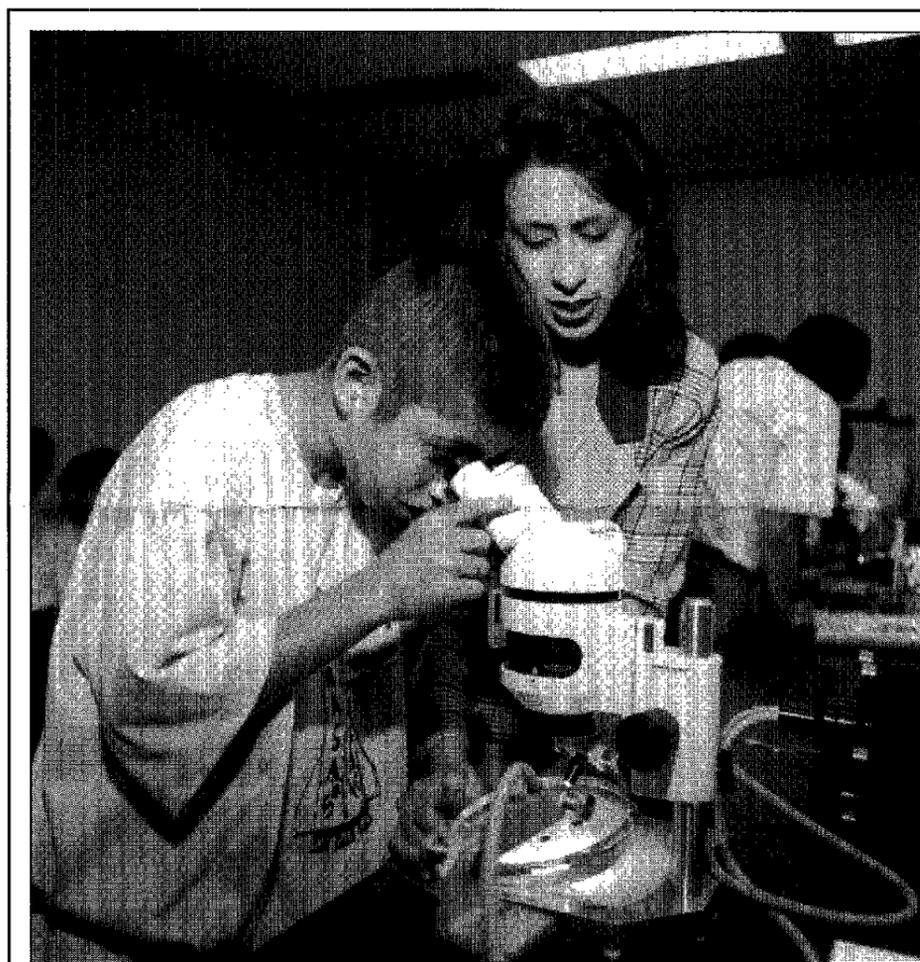
The arrangement between the two space agencies provides for expanded and enhanced cooperation in a number of areas such as space science, microgravity research and the Mission to Planet Earth, and Canada's continuation as a full partner in the International Space Station program.

"I am very pleased that Canada will remain a full partner in the International Space Station program," said NASA Administrator Daniel S. Goldin. "Canada's participation is extremely important to the success of this program," he said.

CSA will retain responsibility for developing the Mobile Servicing System for the space station. To that end, CSA will complete the development of the Space Station Remote Manipulator System and the Mobile Remote Servicer Base System. CSA also will complete the detailed design of the Special Purpose Dexterous Manipulator, but will defer the decision on whether to manufacture the SPDM until 1997.

NASA and CSA also agreed to consider expanded cooperation in other areas. NASA and CSA are exploring cooperation on the Radarsat-2 program, building on the already agreed Radarsat-1 cooperation.

Please see NASA, Page 4



JSC Photo

INSPIRING YOUNG MINDS—Melissa Villegas Drake helps a student from Travis Elementary School, Edinburg, Texas, look through a binocular microscope during a recent visit to JSC's Solar System Exploration Division in Bldg. 31. Drake, a Rockwell employee, is Region 5 vice president of the Society of Hispanic Professional Engineers. SHPE-Texas Bay Area Chapter hosted the 45 students, who come from low social economic status are considered educationally disadvantaged, in an effort to encourage them to continue their educations. The students raised money to make the trip by selling pizzas and chicken and holding a raffle.

JSC's energy conservation efforts working

By Kelly Humphries

A new report issued by JSC's Plant Engineering Division shows that JSC is ahead of schedule as it strives to meet the goals of its Energy Conservation Program, having cut total energy consumption by 21.5 percent over 1985.

That equates to intangible savings of about \$980,000 a year in utility costs, said JSC Energy Manager Dennis Klekar.

The momentum of energy conservation success is growing, he said, with the center seeing an 11.8 percent decrease in its energy use between 1992 and 1993, as measured through monthly British Thermal Unit consumption.

"Since the beginning of the Energy Conservation Program in June of 1991, JSC has made significant progress in reducing utility consumption," Klekar said.

Klekar cautioned that now is not the time for JSC to rest on its laurels, though. The Energy Conservation Program began in 1991 when a Presidential executive order mandated that JSC reduce its energy consumption by 10 percent in non-mission variable facilities by fiscal year 1995 and 20 percent by fiscal 2000, with 1985 as the base year. Since then, however, NASA Headquarters has mandated that mission variable buildings be included, and that an additional 10 percent energy consumption cut be achieved 2000. A new executive order was issued recently, mandating an additional 10 percent reduction.

"That means we must reduce building energy consumption by 30 percent by the year 2005, relative to 1985," Klekar said.

The huge savings accomplished so far have been the result of many operational changes, three in particular.



Earthwatch

Please see OPERATIONAL, Page 4

Columbia rolls over ahead of schedule

Smooth processing flow gives workers two-day jump

By James Hartsfield

Preparations of *Columbia* for an early July launch on STS-65 have gone so smoothly the oldest shuttle was rolled over to KSC's Vehicle Assembly Bldg. slightly ahead of schedule Wednesday.

Columbia will be hoisted vertical and attached to the solid rockets and fuel tank, then moved to Launch Pad 39A Wednesday after a week of work in the VAB.

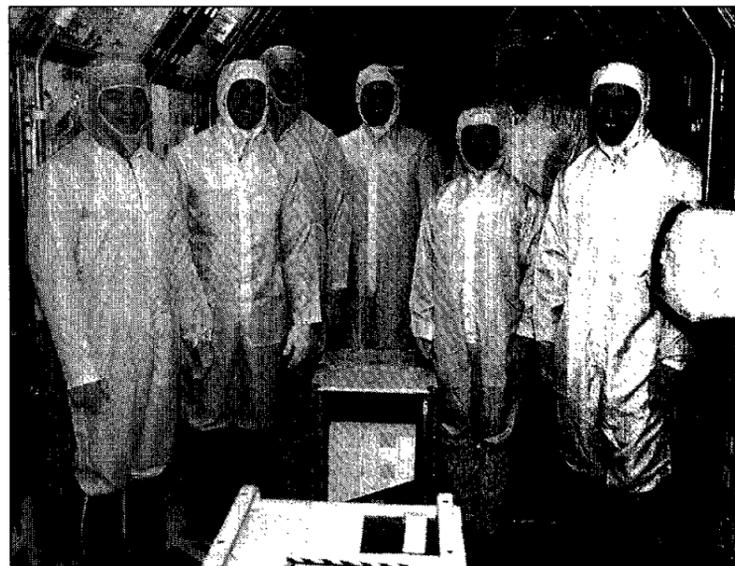
On June 21, the STS-65 crew — Commander Bob Cabana; Pilot Jim Halsell; Payload Commander Rick Hieb; Mission Specialists Leroy Chiao, Don Thomas and Carl Walz; and Japanese Payload Specialist Chiaki Mukai — will travel to KSC to take part in a dress rehearsal launch countdown aboard *Columbia*.

Prior to its move from the Bay 2 processing hangar, a final leak check was made of *Columbia's* primary cargo, the second International Microgravity Laboratory. Other work this week included final tests of the waste collection system; payload bay door closing; closeouts of the avionics bays; weighing of the spacecraft and final check of the landing gear tire pressures.

Discovery, meanwhile, has taken *Columbia's* place in the Bay 2 hangar to be readied for a September launch on STS-64. *Discovery* had been awaiting *Columbia's* vacation of the work space for about two weeks.

Close on the heels of *Columbia's* preparations is *Endeavour*, being readied for a launch on STS-68, the second Space Radar Lab flight, in mid-August, a little more than a month after the STS-65 launch. On *Endeavour* this week in the Bay 1 hangar, the three main engines are being installed. Elsewhere, the antenna is being installed on SRL in the Operations and Checkout Bldg. SRL is scheduled to be moved to the Bay 1 hangar and installed in *Endeavour's* payload bay during the last week of June. In the VAB, technicians completed stacking the STS-65 solid rockets this week.

In the Bay 3 hangar, *Atlantis*, recently back from a year and a half-long stay in California for intensive inspections and modifications, is having the equipment that was used during its piggyback flight cross-country removed this week. *Atlantis* is scheduled for an October launch on STS-66 with the third Atmospheric Laboratory for Applications and Science.



NASA Photo

The STS-65 flight crew poses inside the International Microgravity Laboratory-2 during the crew equipment interface test at Kennedy Space Center. From left are Mission Specialists Leroy Chiao and Don Thomas, Pilot Jim Halsell, Commander Bob Cabana, Payload Specialist Chiaki Mukai and Mission Specialists Rick Hieb and Carl Walz.

JSC

Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Store from 10 a.m.-2 p.m. Monday-Thursday and 9 a.m.-3 p.m. Friday. For more information, call x35350 or x30990.

Astros Games: Tickets available for the Astros vs. Cubs game at 1:35 p.m. July 3. Cost is \$14 for field level seating. Tickets are on sale until June 17.

Country Western Dance: Tickets available for dinner dance from 7:30 p.m.-midnight June 25. Cost is \$15 person and includes barbecue dinner and entertainment. Tickets are on sale until June 22.

Casino Trip: Tickets available for New Orleans Casino trip, July 9 & 10. Cost is \$125 and includes transportation, some meals, hotel accommodations and admission to Queen of New Orleans Casino Boat.

Sleeping Beauty: Tickets available for June 24 performance of Sleeping Beauty by Friendswood Ballet at the Grand Opera House in Galveston. Cost is \$21 for special seating and \$8.40 for general seating.

Splash Town: Tickets available for Employee Activity Association Day at Splashtown from 10 a.m.-8 p.m. June 11 or 12. Cost is \$9.

Six Flags: Tickets available for one-day weekend and weekday admission. Cost is \$20.95 for weekend and \$16.75 for weekday. Two-day admission, either weekend or weekday, is \$27.25.

Seaworld of Texas: Discount tickets: adult \$20.95; child (3-11), \$14.25.

Fiesta Texas: Discount tickets: adult \$18.95; child (4-11) and seniors (55+), \$14.25.

Splash Town: Discount tickets, \$11.05.

Waterworld: Discount tickets, \$10.50.

Astroworld Early Bird: Tickets available for one-day admission for 1994 season. Cost is \$16.75 per person. Tickets must be purchased by May 31.

Moody Gardens: Discount tickets for two of three different attractions: \$9.50

Space Center Houston: Discount tickets: adult, \$8.75; child (3-11), \$4.75; commemorative, \$9.55.

Metro tickets: Passes, books and single tickets available.

Movie discounts: General Cinema, \$4.75; AMC Theater, \$4; Loew's Theater, \$4.50.

Stamps: Book of 20, \$5.80.

JSC history: *Suddenly, Tomorrow Came: A History of the Johnson Space Center*, \$11.

JSC

Gilruth Center News

EAA badges: Dependents and spouses may apply for photo identification badges from a.m.-9 p.m. Monday-Friday; and 8 a.m.-4 p.m. Saturdays. Dependents must be between 16 and 23 years old.

Weight safety: Required course for employees wishing to use the weight room is offered from 8-9:30 p.m. June 28. Pre-registration is required. Cost is \$5.

Defensive driving: Course is offered from 8:15 a.m.-3 p.m. Saturday. Next class is July 9. Cost is \$19.

Aerobics: High/low-impact class meets from 5:15-6:15 p.m. Tuesdays and Thursdays. Cost is \$32 for eight weeks.

Exercise: Low-impact class meets from 5:15-6:15 p.m. Mondays and Wednesdays. Cost is \$24 for eight weeks.

Aikido: Martial arts class meets from 5-7:30 p.m. Tuesdays and 6:15-8:15 p.m. Wednesdays. Black Belt class from 6-8 p.m. Fridays, requires instructor permission. Cost is \$25 per month. New classes begin the first of each month.

Country Dancing: Classes meet Mondays. Beginners class meets from 7-9 p.m.; advanced class meets from 8:30-10 p.m. Partners are required. For additional information, contact the Gilruth Center at x33345.

Softball Tournament: "Fun in the Sun" softball tournament will be held June 25-26. Cost to enter is \$100. Registration deadline is June 22. For additional information, call x33345.

Sailing Club: Sailing lessons are planned for May and June. For information, contact Richard Hoover at x31360 or 996-7716.

Golf lessons: Lessons for all levels. Cost is \$90 for six weeks. For more information, contact x33345.

Fitness program: Health Related Fitness Program includes a medical examination screening and a 12-week individually prescribed exercise program. For more information, call Larry Wier at x30301.

JSC

JSC

Dates & Data

Today

Cafeteria menu — Special: tuna noodle casserole. Total Health: broiled chicken breast. Entrees: deviled crabs, broiled pollock, liver and onions, broiled chicken with peach half, Reuben sandwich. Soup: seafood gumbo. Vegetables: Italian green beans, cauliflower au gratin, steamed rice, vegetable sticks

Monday

Cafeteria menu — Special: Italian cutlet. Total Health: herb flavored steamed pollock. Entrees: barbecue beef, spare ribs with kraut, steamed pollock, French dip sandwich. Soup: black bean and rice. Vegetables: California mix, okra and tomatoes, vegetable sticks, ranch style beans.

Tuesday

Inventors luncheon — The annual JSC Inventors Luncheon will be held at noon June 14 at the Gilruth Center honoring JSC employees whose NASA patents were issued in 1993. For information, contact the Office of Patent Counsel at x31012.

Cafeteria menu — Special: corned beef hash. Total Health: baked potato. Entrees: meatballs and spaghetti, grilled liver and onions, beef cannelloni, ham steak Hawaiian. Soup: split pea. Vegetables: winter blend mix, seasoned cabbage, breaded squash, lima beans.

Wednesday

JAS meets — The JSC Astronomy Seminar will meet at noon June 15 in Bldg. 31, Rm. 129. For additional information, contact Al Jackson, 333-7679.

Cafeteria menu — Special: smoked barbecue link. Total Health: roast porkloin. Entrees: cheese enchiladas, roast pork and dressing, baked scrod, baked chicken, Reuben sandwich. Soup: seafood gumbo. Vegetables: Italian green beans, Spanish rice, turnip greens, peas and carrots.

Thursday

Cafeteria menu — Special: chicken fried steak. Total Health: roast beef with gravy. Entrees: roast beef with dressing, steamed pollock, lasagna with meat, baked chicken, French dip sandwich. Soup: beef and barley. Vegetables: whole green beans, butter squash, cut corn, black-eyed peas.

Friday

Juneteenth picnic — The JSC African American Council Cultural Committee will present its annual Juneteenth picnic and Ron McNair Scholarship fundraiser from 3-9 p.m. June 17 at the Gilruth Center.

Cafeteria menu — Special: fried chicken. Total Health: vegetable lasagna. Entrees: broiled cod fish, beef stroganoff, vegetable lasagna. Vegetables: steamed broccoli, carrots vichy, Italian zucchini, breaded okra.

June 21

Blood drive — Barrios Technology will host a blood drive from 8-11:30 a.m. June 21 at 1331 Gemini. For an appointment, call Tom Hanson, 244-7473.

June 22

AFCEA meets — The Houston Space Chapter of the Armed Forces

Communications and Electronics Association will meet from 11:30 a.m.-1 p.m. June 22 in the Ballroom of the Holiday Inn on NASA Road 1. John O'Neill, director of Mission Operations will discuss the "Operations and Future of JSC." Cost to attend is \$12 for members and \$14 for nonmembers. For reservations, contact Linda Giannukos, 282-7531 by June 20.

JAS meets — The JSC Astronomy Seminar will meet at noon June 22 in Bldg. 31, Rm. 129. D. Scharmm will present a videotape on "Solar Neutrinos." For information, contact Al Jackson, 333-7679.

June 25

Western dance — The EAA Country Western Dance will be held from 7:30 p.m.-midnight in the Gilruth Center. Cost is \$15 per person. Last day to purchase tickets is June 22.

June 29

JAS meets — The JSC Astronomy Seminar will meet at noon June 29 in Bldg. 31, Rm. 129. For more information, contact Al Jackson, 333-7679.

July 4

Independence Day — Most JSC offices will be closed in observance of the Independence Day Holiday.

July 13

PSI meets — The Clear Lake/NASA Area chapter of Professional Secretaries International meets at 5:30 p.m. July 13 at the Holiday Inn on NASA Road 1. For additional information, contact Elaine Kemp, x30556 or Diana Peterson, x30390.

Swap Shop

Property

Sale: 10 acres, Hill Country. 409-925-8770 for recorded message.

Sale: Nacogdoches, Tx, 3-2.5-2, 3013 sq ft, 3/4 acre, GHA, WB, FPL, screened patio, 20'x30' workshop w/garage & storage shelter, \$110k. 486-9206 or 409-560-6537.

Rent: Colorado home, furn. no smoking/pets, dly/wkly/mo. Bob, x30825 or 998-7372.

Rent: Arkansas cottage, Blue MT Lake, furn, 4 acres, \$250/wkly/\$50/dly, x33005 or 334-7531.

Sale: Friendswood, 4-2-2 brick, 1/2 ac, approx 2100 sq ft, \$123.5k, 7% fixed. Mark, x38013 or 992-4132.

Rent: Heritage Park, 3-2-2, 1700 sq ft, \$800/mo + deposit. Sonny, x38533 or 474-4198

Rent: Lake Travis, cabin, boat dock, central CA/H, sleeps 8, wkly/dly, \$457/\$90, 474-4922.

Rent: Galveston condo, furn, sleeps 6, Seawall Blvd at 61st St, wknd/wkly/dly. Magdi Yassa, 333-4760 or 486-0788.

Sale: Friendswood, 4-2-2-2+, 2137 sq ft, FPL, jacuzzi, formal DR, ceiling fans, sec sys, \$105.9k. 992-1466.

Sale: Point Blank, Tx, 1.9 acres, close to Lake Livingston, William, x37310 or 326-2307.

Sale: Luxurious condo, Ft Lauderdale, FL, time share, have video and floor plans, \$10k. Donald, x36851 or 334-3998.

Lease: Wedgewood Village, Friendswood, 3-2-5-2, FPL, WB, both formals, \$825/mo, avail 7/1/94, 482-0874

Lease: Webster condo, 2-1, FPL, all appli, W/D conn, patio, \$495/mo. x31275 or 486-0315.

Sale: Wooded lot, 90' x 135' water view, \$42.5k. Don, x38039 or 333-1751.

Sale/Lease: Friendswood, 3-2-3, LR/DR/den, avail immed, \$69.9k. Gary, x31059 or 480-9716.

Sale: Brookforest, 4-3-5-2, 3600 sq ft, pool, gameroom, sec sys, \$196k. 486-6880.

Sale: University Place TH, 3-2-2, W/D conn, sec sys, FPL, jacuzzi bath, \$80k. 486-6880.

Sale: South Houston patio home, 3/2, ex cond, 15' x 4' pool, deck, \$45k. OBO. 943-1694.

Rent: Galveston condo, sleeps 4, full kitchen, \$625/wkly, dly nego. Pete, 532-4237.

Lease: Clear Lake condo, 2-1, cov parking, sec, \$650/mo incl util. 480-5583 or 482-7156.

Sale: '91 Fleetwood mobile home, 16 x 70, 3-2, set up in LC trailer park, \$19k. neg. 332-7358.

Clear Lake Shores, waterfront loft apart, \$400/mo, \$450/wk boat slip. 486-2148.

Rent: Galveston beach house, dly/wkly, CA/H, furnished. Ed Shumilak, x37686 or 326-4795.

Sale: Galveston beach house, 3-2, CA/H, furnished. Ed Shumilak, x37686 or 326-4795

Cars & Trucks

'78 Chevy Blazer, bwn/wht, 350 V8, AM/FM/cass, A/C, ex cond, \$2.3k. Ed, 481-4889.

'91 Chevy S-10 ext cab, 42k mi, 2 tone, \$75.k; '88 Toyota Corolla SR5 w/sunroof, 5 spd, \$4.8k. Steve or Elaine, 992-3472.

'81 Olds Cutlass Supreme, 2 dr, V6, auto, loaded, 114k mi, \$1875. x30246 or 480-5583.

'91 GT Mustang \$1k & take up notes, payoff \$11k. Henry, x36922 or 409-765-8453.

'88 Ford Tempo, new engine, 4 dr, pwr locks, A/C, auto, AM/FM, \$3k firm. 481-0695.

'70 Datsun PU, mechanically reliable, \$500. Juday, 481-3946.

'87 Acura Legend, 4 dr, white/gray, gray int, auto, sunroof, \$7.9k. Bette, x36369 or 335-0191.

'85 Buick LeSabre LTD, ex cond, \$3.5k. 337-1153 or 334-3254.

'76 Jaquar XJ12L, Chev V8 conversion, A/C, P/S, P/B, auto, Alpine AM/FM/cass, ex cond, \$6.5k or trade for PU or '69/'70 Mustang of equal value. Eulalio, x40235 or 480-7136.

'86 Toyota SR-5, 4x4 PU, \$2k. 474-3424.

'86 Nova, AM/FM/cass, sunroof, no air, \$900. Dave, x45381.

'90 Toyota Tercel, ex cond, red, blk/gray int, 5 spd, AM/FM/cass, A/C, 2 dr, 54k mi, \$4.8k OBO. 543-2667.

'92 Toyota Tercel, red w/blk/gray vinyl int, 4 spd, AM/FM/cass, A/C, 2 dr, ex cond, 10.7k mi, \$8k OBO. Steve, x33521 or 554-6583.

'94 Sportsman camper, 23 ft, loaded, sleeps 5. x39159 or 554-2532.

Boats & Planes

Laser Sailboat, 13'-11" L.O.A., 76 sq ft sail, centerboard, OBO. Jerry, x35226 or 333-2778.

'88 Sportcraft Pesca, 36' x 13', quality components, dry docked, \$90.5k. 360-1978.

Chrysler Classic family boat, 14', O/B Crestliner 45hp, gal trlr, needs work inside, \$750 OBO. Phil, x31936.

Sunfish sailboat, ex cond, multi-colored sail, gal trlr, \$1.2k. Mike, x39147 or 474-7370.

Wet Jet brand jet ski, 432 cc eng, 2-person watercraft, Sportsman gal trlr, custom cover, \$5k. Judy, x33626 or 559-2331.

'85 Mariner outboard eng, 20hp, very low hrs, clean, \$1k OBO. Robert, 334-1677 or 717-8231.

Chrysler 22' sailboat, sleeps 6, galley, head, fixed keel, 5hp O/B, mainsail & 2 jibs, \$2.5k. 282-1727.

Sea Ray Cuddy cruiser, 22.5', 228hp I/O, new Alpha One, VHF, color Furuno depth sounder, \$6.5k. Mark, x38013 or 992-4132.

Cycles

Raleigh Olympian 12 spd bike w/computer, Shimano 100 series pedals, 90 psi tires, \$150. Keith, 3352514 or 332-9414.

'80 Kawasaki LTD 440, ex cond, 7542k mi, w/helmets, \$1k. Susan, x31892 or 332-6141.

Audiovisual & Computers

386DX-16, 2MB/70MB HD, 1.2 & 1.44MB FD, VGA, 14" IBM color monitor, DOS, Windows, \$455; IBM PS2 mod 56, 386SX-20, 4MB/80MB HD, 2.88MB FD, VGA, color monitor, DOS, Windows, \$695. Kelley, x36818 or 488-8194.

Sony Discman D211 w/remote & car adapter, ex cond, \$150. Thanh, x31464.

Original Apple IIe, Apple dual FD, Apple monitor, dot matrix printer, \$100 OBO. Allen, x30791 or 326-4720.

MS SW for Windows: Word 6.0, \$75; Excel 5.0, \$75; Powerpoint 4.0, \$75. 992-1466.

Pioneer CS-88 speakers, \$200/pr. x36813.

Leading Edge XT, 640 RAM, 360k FD 5.25, 20MB HD; Packard Bell b/w monitor; Epson FX-86e, 9-pin printer, WP5.1, manuals, \$200 all. Vicki, 282-0278 or 335-1287.

New fax modem, 19,200 bps V.32 Turbo, upgradable to V.Fast 28,800 bps, new \$1295 sell \$350 OBO. Tony, x4701 or 482-4156.

Fisher compact stereo sys, 2 way speakers, dual tape, synch recording, AM/FM stereo tuner, equalizer, turntable broken, \$25. x33276 or 333-5381.

Musical

Bradbury spinet piano, \$500. Judy, x33626 or 559-2331.

Everard player piano, good cond, dark wood,

thirty-five Master Touch Wordroll music scrolls, made in New York, '29, \$1.5k. 480-7736.

Violin, model 13c, '90, 3/4' body made in W. Germany, Glasser bow, case & music stand, \$500. 488-5517.

Pets & Livestock

Miniature Schnauzers, AKC, 6 wks, 3/m, 2/f, \$200. Sheri, x37451 or 326-1110.

Basenji pups, AKC, red/white males, pointed sire & dam, \$400. x33042 or 482-3858.

AKC Brittany Spaniel puppies, orange/white, stud service also avail. Barry, x38410

Household

Sectional 3 pc sofa, creme, w/matching coffee table, \$600/both; Panasonic microwave, 700 watts, \$75. 334-3998.

China cabinet/buffet, new \$900 sell \$600; area rug, wool, 12 x 16, \$500. 474-9325.

Qn sz waterbed, semi-motionless, 6 drwr pedestal, mirrored headboard, \$200. x39359.

Black TV stand, fits 35" TV. x35590 or 991-0821.

Master BR 5 pc, kg sz oak waterbed w/mirrored wood canopy, motionless matt, lg oak mirrored dresser & stand-up chest of drwrs, 2 night stands, \$1.5k. 480-7736.

Hide-a-bed sofa, blue w/peach flowers, \$350; gumball machine/stand, \$25; sm wood desk, \$15; oak colored entertainment center, \$150; wood DR table w/4 chairs, \$150; oak colored microwave tbl, \$35; 2 old school desks, \$25/fg, \$20/sm desk. Gloria, x31891 or 538-2283.

Marble dining room table w/8 black lacquer chairs, \$1.5k; refrig, \$300; x39018 or 480-7610.

White 5-dwr chest of drwrs, \$50; bm 6-dwr dresser, \$55; metal desk, \$90. Faye, 470-1455.

4 drwr chest of drwrs, \$120. Sam, 332-3168.

Solid wood frame, brown, matching couch & loveseat, coffee tbl & end tbls, \$300. Allen, x30791 or 326-4720.

White lacquer bedroom furn, dbl dresser w/mirror, armoire, \$300; pastel sectional, \$350; contemporary coffee tbl & matching end tbl, ceramic base, glass top, \$325. 480-1112.

Qn sz waterbed w/bookshelf/padded side rails, semi-waveless, needs heater \$100 OBO. Sheri, 480-3904.

Twin bed w/padded hdbd, \$25; two sleeping bags, \$7/ea; baby hi-chair, \$10; hi-chair w/no tray, \$5. Darrell, x36803 or 326-5834.

Butcher block dinette set w/4chairs, \$100/set; 4 drwr dresser. \$45. 946-1924.

Twin sz water bed on 6 drwr pedestal base, \$100. Ken, x31682 or 488-0792.

Kenmore W/D, beige, \$200. Andy, 280-4551 or 409-925-1586.

Oak BR set, twin bed, hdbd, 9 drwr w/mirror, night stand, \$400. David, x33425 or 480-8718.

White metal bunk bed, full sz bottom, twin sz top, \$300 OBO; 3 pc white BR set, \$150 OBO; water carbonation machine, \$50 OBO, upright vacuum, \$30 OBO. Tony, x47401 or 482-4156.

Kg sz waterbed, lighted hdbd, heater, sheets, pillow cases, \$200; 2 matching nightstands, \$50. 334-2467.

Maytag washer, \$300; Maytag dryer, \$240 or both, \$500; GE refrig, \$350, all items OBO. x45652 or 532-1581.

Maytag W/D, \$350; beige couch/ sleeper sofa, \$250; pine end tbl & coffee tbl, \$75 ea; 2 lamps, \$40/ea; cast-iron day bed, \$250; qn sz water bed w/lighted hdbd & heater, \$100, rattan book case w/glass shelves, \$60. x39335 or 854-6280.

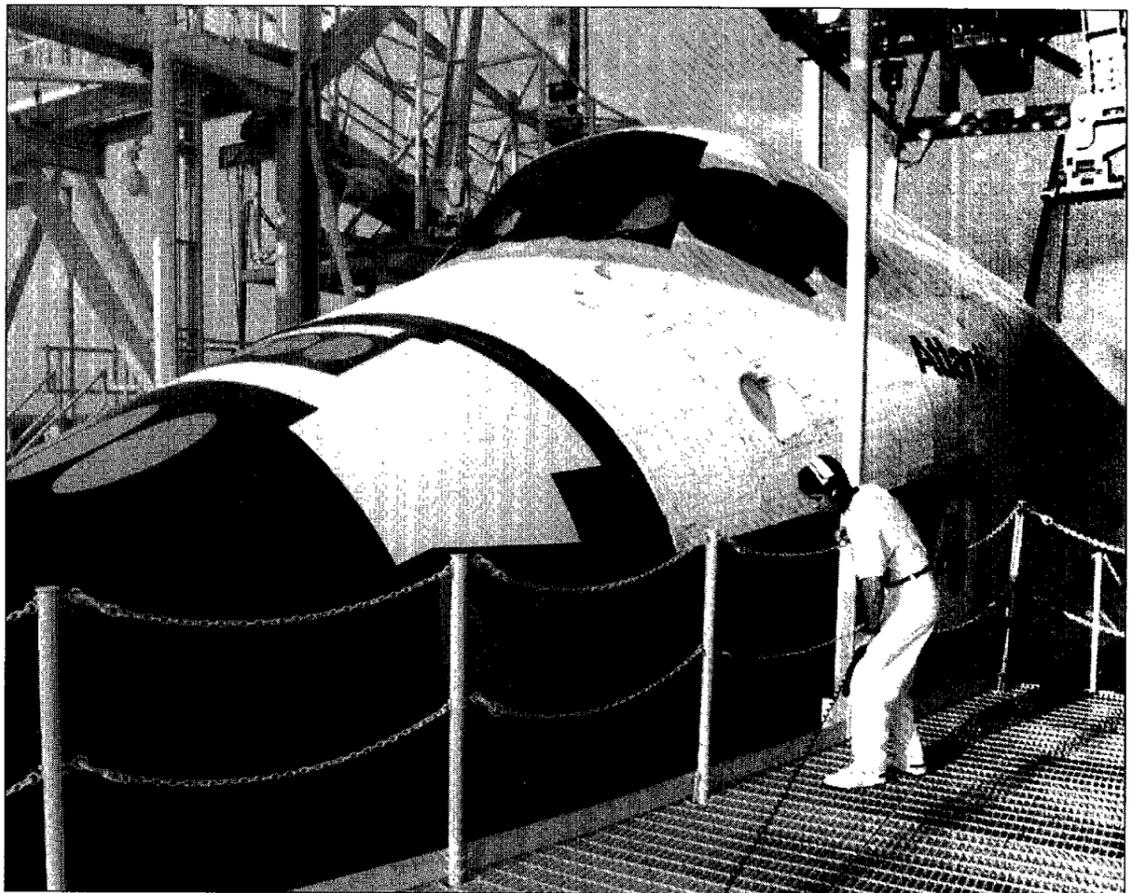
Tappan electric solid surface range w/hood, continuous cleaning oven, \$300 OBO. 922-6674.

Custom-made bar chairs, two, orange vinyl w/blk chrome legs, \$25/ea. x33276 or 333-5381.

Cookware, 20 pcs, 18/8 stainless steel, 5-ply Strata-Therma const, heat resistant handles, new \$1k sell \$600. Sonda, x393

Back on home ground

Modified orbiter returns to begin cooperative flights



By Eileen Hawley

When the shuttle *Atlantis* returned to Kennedy Space Center on May 29 mounted atop its 747 Shuttle Carrier Aircraft, it marked the first time in 19 months that the entire shuttle fleet was housed at KSC.

With work to ready *Discovery*, *Endeavour* and *Columbia* continuing in KSC's Orbiter Processing Facility, *Atlantis* glided onto the runway following its coast-to-coast piggyback ride.

Atlantis left KSC for its ferry flight to Rockwell International's orbiter manufacturing facility in California in October 1992 to begin work to maintain the nine-year-old vehicle's structural integrity and keep the shuttle fleet technologically up-to-date. *Atlantis* returned boasting enhancements and modifications that will allow it to remain in orbit for extended periods of time and to dock with Russia's Mir space station.

"Watching *Atlantis* roll over to the lifting frame felt good," said Vehicle Integration Team member Mark Adams. "It looked real clean, and the folks at Palmdale did a lot of work getting it ready. Watching the vehicle be put back together toward the end of the maintenance period, with everything closed out and it looking like a real orbiter again, was a great feeling. I'm confident that they did a quality job."

All shuttles are scheduled for an orbiter maintenance down period about every three years. During this scheduled maintenance period, equipment upgrades and inspections are performed. In the case of *Atlantis*, the work also included specific modifications to ready the vehicle for the flight of STS-71, currently targeted for mid-1995.

Prior to the STS-71 mission, during which *Atlantis* will dock with the Mir space station and return shuttle astronaut Norm Thagard and cosmonauts Vladimir Dezhurov and Gennadiy Strekalov to Earth following a three-month stay on the station, *Atlantis* will fly on STS-66.

During that mission, *Atlantis* will carry the third Atmospheric Laboratory for Applications

and Science payload into orbit conducting atmospheric, sciences and environmental research. Launch of STS-66 remains targeted for October.

Following the flight of STS-66, *Atlantis*' next five scheduled missions are to dock with the Mir space station as part of Phase One cooperative activities toward the construction of the international space station.

To allow *Atlantis* to accomplish these missions, the \$74 million refurbishment and upgrade work on *Atlantis* included more than 800 improvements, modifications and enhancements to the orbiter's avionics,

subsystem and structure and thermal protection systems.

Work on the shuttle's avionics systems included improved nose wheel steering modifications, an improved radar altimeter antenna, wiring protection changes, and provisioning for a future retrofit of improved tactical air navigation systems.

Technicians also inspected the vehicle's structural areas performing visual and nondestructive tests to search for fatigue, corrosion, stress cracks or broken rivets and welds. Results of these inspections confirmed *Atlantis* is in excellent condition, free of significant corrosion or degradation. In addition, *Atlantis*' load carrying capacity was upgraded.

Extended Duration Orbiter modifications made to the vehicle included fitting of internal plumbing and electrical connections to enable the orbiter to carry an extended duration orbiter pallet. The pallet holds four tanks of liquid hydrogen and liquid oxygen used by the orbiter's fuel cells to generate electrical power and provide drinking water; a fifth cryogenic

tank set; additional nitrogen tanks for the crew cabin atmosphere; and a regenerating system for removing carbon dioxide from the cabin atmosphere.

In addition to these modifications and inspections, work on *Atlantis* included checkouts of its improved auxiliary power units, inertial measurement units, power reactant storage and distribution systems, and electrical, communications and main propulsion system.

Atlantis returned to KSC following a two-day ferry flight from California. Originally, NASA managers had planned a one-day cross-

country voyage with a brief refueling stop at Ellington Field. However, poor weather conditions, including a line of severe thunderstorms across the southeast section of the country, forced a change in plans.

Atlantis left Palmdale, California about 7 a.m. Central Daylight Time May 27 for its return trip to KSC. The flight plan called for the orbiter to overnight at Tinker Air Force Base in Oklahoma City, Okla.,

but severe weather forced a mid-flight change of plans, and the orbiter diverted to Biggs Army Air Field in El Paso, Tex. where the orbiter and shuttle carrier aircraft remained overnight. The next morning, with weather predicted clear between Texas and Oklahoma, the 747 and orbiter flew through to Warner-Robbins Air Force base in Georgia.

On May 29, with good weather again forecast, the two aircraft left Georgia for KSC, arriving in the early morning.

Once on the ground in Florida, *Atlantis* was towed to the Orbiter Processing Facility where work is under way to ready the vehicle for its upcoming launch, targeted for October.

Adams monitored the work begin performed on *Atlantis* during its stay in Palmdale. Adams,

and Vehicle Manager Al Branscomb, traveled between JSC and Rockwell during the maintenance period.

"The full test of some of the modifications performed on *Atlantis* will be seen during STS-71," Adams said. "All of the modifications made to the orbiter are good modifications, and the crew on STS-66 will be able to take advantage of them. But STS-71 will give the public its first real chance to see the result of the modifications."

Atlantis is NASA's fourth shuttle, delivered in April 1985 and flying its first mission in October that year. Prior to its refurbishment, the orbiter successfully completed twelve missions, including five dedicated Department of Defense flights, and missions to deploy the Magellan and Galileo spacecraft, the Gamma-Ray Observatory, and the first ATLAS mission.

The next vehicle scheduled for an orbiter maintenance down period is *Columbia*, the oldest vehicle in the shuttle fleet.

At Rockwell's orbiter manufacturing facility in California, a team of employees already is working on planning and tooling refurbishments for *Columbia*'s arrival sometime in the Fall. Refurbishment of *Columbia* is expected to last about seven months.

Work on NASA's maiden shuttle will include structural inspections and the incorporation of more than 60 upgrades to the vehicle. Planned upgrade work involves the first phase of the Multifunctional Electronic Display System technology, more commonly known as the "glass cockpit."

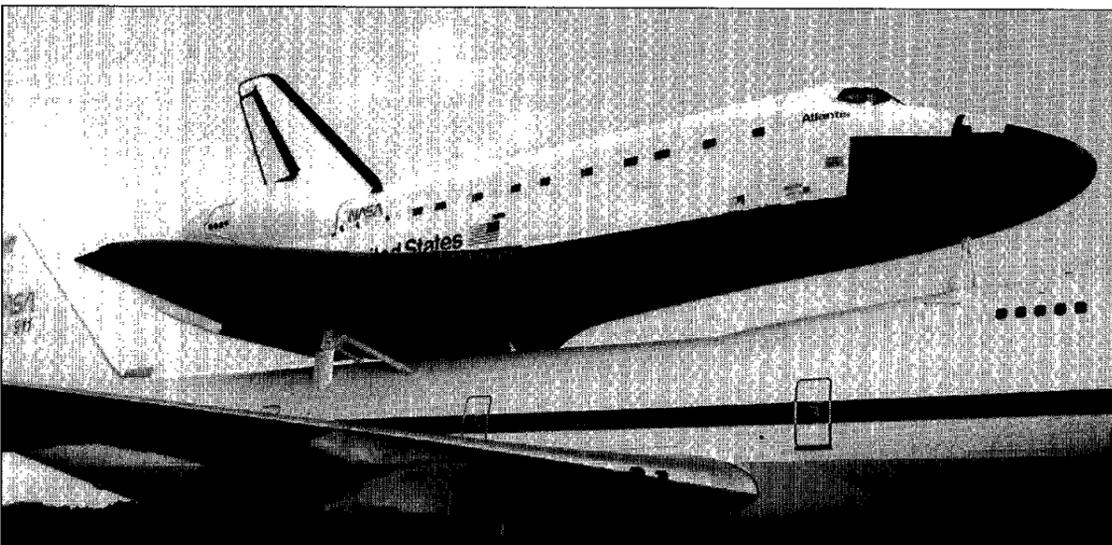
Once work on *Columbia* is complete, *Discovery* will travel to California for its maintenance down period.

Discovery is scheduled to arrive at Palmdale in September, 1995 where it will receive the same basic upgrades and modifications as *Columbia*, as well as installation of a fifth cryogenic tank set and modifications to allow it to dock with the Mir space station. Additional upgrades to allow *Discovery* to dock with the international space station also are planned.

Endeavour, originally delivered to NASA in 1991, is scheduled for orbiter down time sometime after *Discovery*'s return to service. □

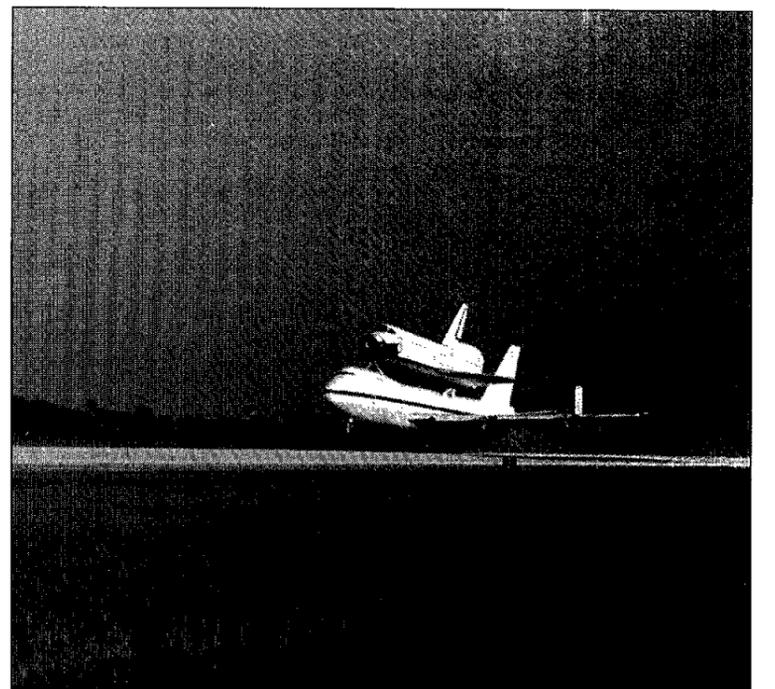
'Watching the vehicle be put back together toward the end of the maintenance was a great feeling. I'm confident that they did a quality job'

— Mark Adams
Vehicle Integration Team member



NASA Photos

Top: Following its return from 19 months of modifications in California, *Atlantis* rests in the Mate/ Demate Device at the Shuttle Landing Facility. The orbiter completed a two-day ferry flight returning to KSC on May 29. Above left: Mounted atop the Shuttle Carrier Aircraft, *Atlantis* makes its appearance in Florida. Protective pods cover the Reaction Control and Orbital Maneuvering Systems. Right: *Atlantis* and the SCA roll down the Shuttle Landing Facility runway.



Scientists discover unusual high-energy flashes in atmosphere

Scientists at Marshall Space Flight Center report they have discovered unusual gamma-ray flashes in the upper atmosphere high above thunderstorms.

These high energy bursts have never before been seen in the Earth's atmosphere or surrounding space, according to Dr. Gerald Fishman of Marshall's Space Science Laboratory.

These flashes were detected by the Burst and Transient Source Experiment, an instrument aboard

NASA's orbiting Compton Gamma Ray Observatory.

"It is suspected that these flashes come from a rare type of powerful electrical discharge, similar to lightning, above large thunderstorm regions," Fishman said.

"The flashes are very brief, lasting only a few thousandths of a second, although some of them consist of multiple pulses." They are seen very infrequently: only about 20 have been seen since the observatory was launched in April 1991 from the

Space Shuttle *Atlantis*.

"We saw our first flash of this type the first week that the detectors were turned on. We didn't know what to make of it," said Fishman. In order to detect gamma rays with spaceborne detectors, they must be produced at altitudes above 100,000 feet. This is considerably higher than normal weather processes, according to Fishman.

The observations have been confirmed by other instruments on the observatory. The BATSE detectors

on the observatory were originally designed for sensitive observations of celestial objects in wavelength regions unobservable from the ground.

"The gamma-ray observations from the Earth's atmosphere come as a complete surprise to us. Atmospheric scientists are also surprised," said Fishman.

"For many years, aircraft pilots have reported 'upward-going' lightning in clear air over thunderstorms. But these reports were either never

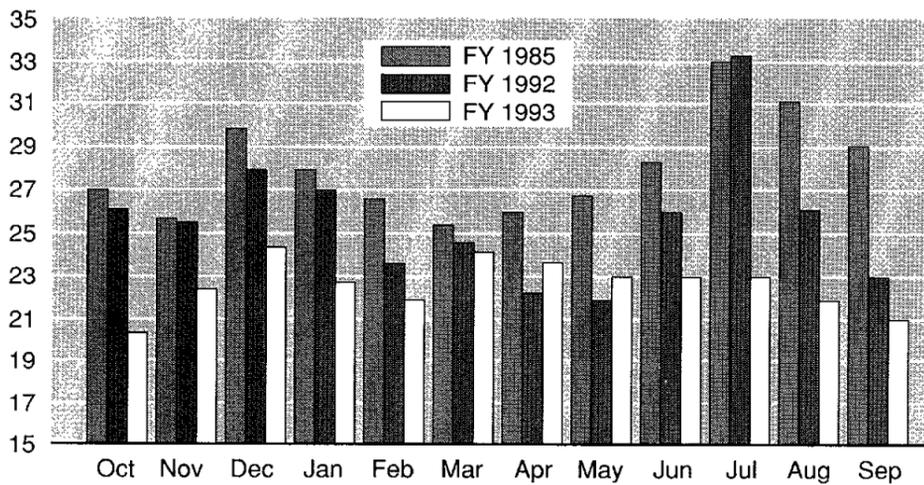
taken seriously or were never studied in a scientific manner," he said.

In recent years, there have been video observations of electrical discharges above thunderstorms taken from the shuttle and from research aircraft. The new gamma-ray flash observations may be related to these optical observations, Fishman said.

"It is becoming apparent that the upper atmosphere is much more electrically active than we ever suspected," he concluded.

NASA JSC Monthly Btu Consumption

Btu $\times 10^3$ /GSF



Total Energy Consumption is Down 11.8% Compared to 1992 and 21.5% Compared to 1985 (Gross Square Footage Values)

Operational changes help cut energy use

(Continued from Page 1)

One major contributor to the savings was increasing the temperature in the chilled water system that cools JSC buildings. The central heating and cooling plants are generating 45-degree Fahrenheit water now instead of the 42-degree water used previously. The operational shift increases chiller efficiency and saves about 4.7 megawatt-hours of electrical energy a day.

Another advancement involved placing the electrically driven chillers in Bldg. 28 in a continuous operational mode since they are more efficient than those in Bldg. 24. That change saves about 10 megawatt-hours a day.

The final big-ticket item was JSC employee participation in the Night Load Reduction Policy. By reviewing their facility requirements, JSC workers have cut the

operational hours of equipment and saved about \$290,000 a year.

But employees still can do more, Klekar said.

"Recent spot surveys indicate that lights and equipment are still being left on after hours and many thermostats are still not in compliance with JSC's Energy Conservation Standards. Another 3 percent in energy reduction could be achieved through strict adherence to established guidelines."

A recent independent energy audit conducted on one of JSC's buildings showed that its energy usage ranked 77th worst out of 90 buildings surveyed in Texas with similar functions.

"We need to remember that lights and equipment must be shut off at the end of the work day," Klekar said. "The last one out should turn off the lights."

At present, there are two more

major energy use reduction plans under way. One involves replacing JSC's standard two-tube fluorescent light fixtures with more efficient tubes and ballasts through a shared energy savings contract that would pay for the retrofit by the savings it generates. The project could save some \$500,000 a year and reduce JSC's electrical consumption by another 3 percent. The other project would replace the electrically driven chillers in Bldg. 24 with more reliable and efficient chillers similar to those operating in Bldg. 28, resulting in another 3.5 percent reduction in utility consumption.

"In general, JSC is doing a very good job in reducing utility consumption and meeting mandated levels," Klekar said. But more can be saved through everyone's cooperation and the corporation of new technology."

Solovyev, Budarin to stay aboard Mir

(Continued from Page 1)

Baker, 41, was a mission specialist on two previous flights: STS-34 in October 1989 on *Atlantis* and STS-50 in June 1992 on *Columbia*. Prior to this assignment, Baker had been working space station operations issues.

Harbaugh, 38, has flown twice as a mission specialist: STS-39 aboard *Discovery* in April 1991 and on *Endeavour's* STS-54 mission in January 1993. Since that flight he has served as a spacecraft communicator in Mission Control and as the backup space walking expert for the Hubble Space Telescope servicing mission last year.

Dunbar, 44, currently is training as the backup crew member to Norm Thagard for the Soyuz-Mir 18 mis-

sion in Star City, Russia. STS-71 will mark her fourth shuttle flight. She was a mission specialist on STS 61-A in October 1985, STS-32 in January 1990 and STS-50 in 1992.

Cosmonauts Solovyev and Budarin will serve as the next crew to stay for an extended period aboard the Mir and are designated the Mir-19 crew. Solovyev, 45, was born in Riga, Latvia, but resides in Star City, Russia. Budarin, 40, was born in Chuvash Autonomous Republic, Kiriya, Altir region. He lives in Kaliningrad outside of Moscow, Russia.

Solovyev and Budarin will switch places with the Mir-18 crew — Dezhurov, Strelalov and Thagard — which is scheduled to conduct three months of experiments aboard Mir

before returning to Earth aboard *Atlantis* with the other five crew members.

Dezhurov, 32, was born in Mordov Autonomous Republic, Yavas, Zubo-Polyansky district. He resides in Star City. Strelalov, 53, was born in Mitishchi outside of Moscow, Russia and now resides in Moscow.

Thagard, 50, has flown four times on the shuttle and will be a member of the Mir-18 crew scheduled for launch aboard a Soyuz spacecraft from the Baikonur Cosmodrome in Kazakhstan.

Thagard's shuttle missions include STS-7 in June 1983 and STS 51-B in April 1985, both aboard *Challenger*; STS-30 in May 1989 on *Atlantis*, and STS-42 in January 1992 aboard *Discovery*.

NASA and CSA announce space cooperation plan

(Continued from Page 1)

tion in which CSA provides the spacecraft and NASA contributes a medium class launch.

CSA also has proposed two cooperative science small satellite (smallsat) missions under Canadian mission management to be developed with NASA's participation. NASA and CSA will establish a joint study

group to define the science priorities and other details for specific cooperative projects. Based on the recommendation of the joint study group, NASA and CSA will pursue a detailed agreement where NASA would provide selected experiments and up to two small class launches.

NASA and CSA also have agreed on new joint microgravity activities

using DC-9 aircraft and sounding rockets. This will be done on a primarily cooperative basis, with NASA and CSA sharing most of the data from the missions.

Also, NASA will provide opportunities for one Canadian astronaut flight per year during the Space Shuttle/Mir Space Station docking missions and space station assembly.

Center inventors receive accolades

Twenty-six center employees will be honored Tuesday for their technological innovations at the annual JSC Inventors Luncheon.

JSC Director Dr. Carolyn Huntoon will present awards to employees whose NASA patents were issued in 1993 at a noon ceremony in the Gilruth Center. Honorees include Richard Sauer for the Regenerable Biocide Delivery Unit. Sauer's system for controlling microbial contamination in drinking water also earned him honors for the NASA Government Invention of the Year and the NASA Commercial Invention of the Year earlier this year.

Other honorees are: Steven Koontz for Atmospheric Pressure Flow Reactor - Gas Phase Chemical Kinetics under Tropospheric Conditions without Wall Effects, Method for Anisotropic Etching in the Manufacture of Semiconductor Devices and Method for Preparation of a Microporous Structure with Layered Interstitial Surface Treatment; Mark Rovig, General Method of Pattern Classifications Using the Two Domain Theory; Erik Evenson and Clarence Wesselski, Quick-Connect Fasteners for Assembling Devices in Space; Lui Wang, Dynamic Pattern Matcher Using Incomplete Data; George Parma, Robot-Friendly Connector; Jon Kahn, Method and Apparatus for Preloading a Joint by Remotely

Operable Means; Hatice Cullingford, Apparatus and Method for Cellulose Processing using Microwave Pretreatment; Horacio de la Fuente, Komel Nagy, and Clarence Wesselski, Energy Dissipator; and Timothy Fisher, Programmable Remapper with Single Flow Architecture;

Michelle Rucker, Ablative Shielding for Hypervelocity Projectiles; Thomas Sullivan, Method for Producing Oxygen from Lunar Materials; Robert Shelton, An Accelerated Training Method for Back Propagation Networks; Brian Morris for Check Valve with Poppet Damping Mechanism; for the Cooled Spool Piston Compressor; and Check Valve with Poppet Dashpot-Frictional Damping Mechanism; Andrew Petro, Space Station Trash Removal System; William Thornton, Treadmill for Space Flight; James Villarreal and Robert Shelton, Space-Time Neural Network for Processing Both Spatial and Temporal Data; Margaret Girmaldi and Leslie Hartz, Thermally Activated Retainer Means Utilizing Shape Memory Alloy; George Salazar, Reconfigurable Fuzzy Cell; Robert Harvey, Apparatus for Simulating an Exoatmospheric Structure; Kent Castle, Extra-Corporeal Blood Access, Sensing, and Radiation Methods and Apparatuses; Michael Roberts, Tetrahedral Lander.

Juneteenth picnic Friday

The annual Juneteenth Picnic and Ron McNair Scholarship Fundraiser is set for Friday at the Gilruth Center.

Hosted by the NASA/JSC African American Council Cultural Committee, the event will include a barbecue dinner, dessert, drinks and entertainment. Cost is \$10 for adults, \$5 for children 12 and under.

A softball tournament also is planned. The highlight of the picnic

will be the presentation of the JSC Black Cultural Association Ron McNair Scholarship to Avarita Shari Williams.

The picnic and celebration will run from 3-9 p.m. at the pavilion. Tickets may be purchased through today.

For additional information on the picnic or the scholarship, contact Judith Elam at x34028, Mark Falls at x38627, or Jackie Wilson at x30278.

Employees' children earn scholarships

The children of two JSC employees will receive up to \$1,000 a year for four years as winners of this year's JSC Exchange Scholarship.

Susan C. Seago and Matthew S. Lichter are the 734d and 74th recipients of the scholarship, which provides \$4,000 for study at any accredited college or university. Winners are selected on the basis of their overall scholastic achievement, the extent of their financial need and

the breadth and substance of their school and community activities.

Seago, the daughter of Robert Seago of the Mission Operations Management Services Offices, plans to study accounting at Baylor University.

Lichter, the son of Elaine C. Ackel of Engineering's Life Support Systems Branch, plans to participate in a degree program for equestrian studies at the University of Findlay.

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Editor Kelly Humphries
Associate Editor Kari Fluegel
Associate Editor Eileen Hawley

Silver Moon Cafe closed for summer

The Silver Moon Cafe located in Space Center Houston is closed temporarily for renovations.

Renovation work will continue through the summer with the restaurant scheduled to reopen sometime in September. The restaurant will get a new look, including a conference room for lunchtime meetings.

The Silver Moon promotion extended to JSC civil service and contractor employees was shortened by the renovation work. Drawing for the grand prize trip to San Antonio and the free meal for a party of six was Monday.

For details, call 244-2140.